Distr.
LIMITED

UNIDO/IS.430
27 December 1983

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH

THE MINERAL INDUSTRY OF DEVELOPING AFRICA*

A brief review of some current issues.

Prepared by the

Division for Industrial Studies
Regional and Country Studies Branch

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V.83-65700

FOREWORD

Within its studies programme on industrial development prospects in individual and groups of developing countries, the Regional and Country Studies Branch of UNIDO is giving particular attention to issues pertaining to strategies and policies for industrial development and restructuring. This paper briefly reviews the prospects for mineral based industries in developing countries of Africa during the 1980's.

Due to lack of recent comprehensive data on Africa as a whole, the paper relies extensively on illustrative examples of some individual countries. The paper can thus only provide an overview of African countries' efforts and problems in developing a resource based industrial structure.

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I. INTRODUCTION

The World Economic Situation and Developments in the Minerals Producing African Countries

In view of the prolonged world recession of the mid-seventies/early eighties and depressed world markets for minerals, many minerals producing countries found themselves in the non-enviable position of declining prices for their minerals, shortages of foreign exchange, inability to import needed new and replacement equipment and spares for their mining/processing operations, shortages of foreign investment, lack of domestic generated capital and inability to borrow in financial markets. Among developing countries, the hardest hit are those countries with little or embryonic industrial base, with no developed indigenous energy resources and those who happen to be land-locked. Many of the developing African countries have been facing these constraints in addition to political unrest.

The African continent is rich in minerals resources.[1/] As the Annex details, Africa's minerals range from industrial minerals, construction minerals, gold and diamonds to oil. The contribution of the mining sector to the gross national product of developing Africa has increased on the average by 10 per cent between 1960 and 1980.

During the early to mid-seventies, the mining sector's production declined sharply, partly because of political unrest in the major minerals producing African countries and partly because of the general economic situation spiraled by the energy crisis.

1/ The issues discussed below pertain to all African countries except South Africa. South Africa is excluded as atypical of the rest of the continent both on social and economic grounds. When it is relevant to the other mineral resources we will discuss oil resources, however, oil minerals resources have not been considered in this paper. Also, we are not including a discussion of sea bed minerals. Although their importance is immense, the scope of this paper is limited to soil non-oil minerals.

The eighties started rather poorly and 1981 may be remembered as the year of world depression and the year of low consumption and revenues for all metals/minerals. As consumption has fallen so too supply capacity has been reduced. Poor demand resulting from world recession placed unrelenting pressure on prices. In many cases, prices fell well below the marginal cost of production of some mines and thus companies have been forced to close capacity, or to increase borrowings at high interest rates. In some cases national governments provided assistance.

Adverse international economic repercussions have been compounded by international monetary policies of developing countries. Overvalued local currencies have contributed to black market, smuggling of commodities out of the country, high local costs and scarcity of foreign exchange. Consequent delays in the provision of spares and equipment have been developing, affecting all industries. In Ghana* for example, falling prices of mining products coupled with an overvalued currency and with high local costs and in certain cases with depleted reserves, have caused an actual or anticipated loss by all mining enterprises within the country.

Energy costs around the world have contributed to high production costs and to the erosion of profitability and growth of industry both in developed and developing countries. Particularly, developing countries whose growth depends on export-led industries have suffered most since increasing costs have rendered their industries unprofitable. For example, the financial situation of the Liberian* mining companies has been critical with prices remaining at 1980 levels or being reduced. This development coupled with rising energy and production costs resulted in cash shortages and serious operating deficits in the mining sector of this and other African countries.

Even the relatively more industrialized among the African countries such as Zaire* have been suffering from insufficient supplies of fuel and spare parts and lack of foreign exchange and credits resulting to below capacity productivity. However, some sub-sectors have been able to

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* See Table 2 "Mineral Resources of Africa/Production, 1980"

perform better than others; mining activity in copper has experienced a clear upswing since 1980.

Besides the effects of the world economic situation, mining activity in many African countries has been hampered by internal and external political problems. For example, South Africa's dominance of the Southern part of Africa has both political and economic effects on neighbouring countries, especially small land-locked countries. Lesotho*, Botswana* and Swaziland* are depending largely upon South Africa for their economic and industrial development. Besides the political aspects involved in this relationship there is an economic development unevenness which creates a sort of economic duality - especially if one considers that these countries' labour force depends to a great extent on employment in South African mines. In Lesotho and Botswana, diamonds represent the main export. The diamond industry is operated by a South African mainly based company, with approximately 25 per cent shares of the respective host-governments. The last year or two, the poor market conditions for diamonds prompted the company to impose quotas on its main producing countries. This had severe impact on both Lesotho's and Botswana's export earnings. Namibia* is facing a declining economy with no substantial South African or international investors being willing to invest in the country's mining development and exploitation. Zimbabwe's* links with South Africa, being historical, are mainly in the form of joint ventures, trade, technical and management services.

The adverse world economic conditions have affected seriously several mineral producing countries and have prompted re-organization of the institutional machinery and the introduction of a range of measures intending not only to stimulate the development of minerals but to promote general economic development as well. The following sections describe some of the problems and issues facing developing Africa in the 1980s, and indicate how individual African countries are fending-off or plan to fend-off these problems.

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* See Table 2, op.cit.

II. MEASURES AND POLICIES IN MINERALS PRODUCING COUNTRIES

Increasing productivity and financing capabilities through mergers and internal re-organization

Increasing the size of the mining operations through mergers, cutting-down costs through scale operations and embarking into an internal re-organization are measures that may increase productivity and consequently the capability of mining operations to obtain external financing. Accordingly, in some African countries, steps were taken to merge mining companies.

For example, in Zambia*, the final decision was taken to merge the two state-controlled mining companies into the Zambia Consolidated Copper Mines Ltd. (ZCCM), as of April 1982. The merged companies are both cobalt and copper producers. The benefits of the merger are expected to be the co-ordination of planning activities and management as concern extraction, production and capital expenditure; the creation of a stronger fund-raising capability in the international money market; more efficient utilization of scarce resources - such as technical skills; strengthening of the ability to develop research and development, prospecting, exploration and exploitation; developing greater capability in marketing and services; achieving greater economies of scale. ZCCM is now the world's second largest individual copper producer after the Chilean conglomerate Codelco. Its annual production capacity is 700,000 tons of copper, 4,000 tons of cobalt and 76,000 tons of lead and zinc. It employs 60,000 people, and is Zambia's only significant revenue earner. However, depressed world trading conditions inhibit the manifestation of this country's full potential. Zambia deals with depressed world prices for metals by cutting costs, both in terms of equipment purchased and number of workers employed and by using less contractors.

Although large-scale operations have several benefits in terms of cost reductions and financing capabilities, several African countries rely still heavily on small mining companies for the development of their

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* See Table 2, op.cit.

mineral resources. For example, in Algeria*, Morocco* and Zimbabwe* small mines represent an important part of the mining sector and receive governmental support. Notwithstanding the contribution of small mining to the economy of several countries, there is an important implication: during periods of economic adversity, small mining concerns appear to suffer more than the larger ones.

Re-organization of institutions and streamlining of legislation to attract new investment and to promote development of resources through own efforts and/or foreign investment

In order to attract new investment, maximize national benefits and solidify existing ones, several African governments have embarked into the enactment of minerals legislation that endeavours to both clarify and simplify contractual arrangements, as well as to establish appropriate institutional apparatus.[1/] For example, in Morocco, the intensification of all forms of mineral activities led to the creation of a new national institution which supervises all hydrocarbon development (ONAREP) while non-fuel mineral development is under the auspices of two other institutions (BRPM and OCP).

Considerations to promote the development of mineral resources have also prompted Tanzania* to form a Ministry of Mines and to announce short-, medium- and long-term mineral development plans and Kenya* to establish a new unit within the Environment and Natural Resources Ministry; this unit has the task to make a country-wide survey for industrial minerals including limestone, gypsum, asbestos and diatomite.

These activities reflect the recognition by governments of the importance of industrial minerals to national development, as well as, the recognition that such materials are of little interest to outside mining houses. Several efforts are being directed towards developing industrial and construction minerals with internal capital and borrowing.

1/ However, certain African governments are not as eager to attract foreign capital. In Benin, the current government's attitude towards foreign investment remains unclear - a fact that discourages investment in the country's unsubstantiated mineral resources.

* See Table 2, op.cit.

Part of these efforts, as in the case of Zaire, are directed towards overhauling needed infrastructure for the development of mineral resources.

Re-organization has been taking place not only in institutions but at the company level as well. For Gécamines which is the keystone of Zaire's economy generating more than 63 per cent of the country's revenue, the revival in copper production is the result of sustained efforts to regain the level of productivity existing before the events of the internal strife in the seventies through re-organization, retraining of personnel, refurbishing of stocks of essential supplies, and renovation of plants.

Retrospectively, private and governmental re-organization in terms of institutions, legislation, financing capabilities, research and development, scarce resources (technical skills), size, marketing, planning and management opted to stimulate the development of minerals and contributed to both the mineral industry and the general economy.

Diversifying the industrial base and exports

In contrast to finished manufactured goods, exports of primary commodities are subject to great price and quantity fluctuations which cause substantial instability in export revenues. The less diversified is an economy the greater is the instability and ensuing repercussions. Several countries in Africa are suffering from instability on primary commodity markets because their exports are insufficiently diversified and concentrate on only a few materials. Nearly half of the primary commodity producing countries obtain over 50 per cent of their export revenues from one single commodity.

For those African countries that are nearly or clearly mono-product economies conscious efforts are being made to diversify if they have possibilities. For example in Nigeria*, petroleum dominates the economy. Oil exports constitute the primary source of export earnings. In 1981 and 1982, however, the oil glut in the world market affected Nigeria's oil revenues. The Nigerian Government, conscious of the country's potential

to diversify, is encouraging the development of the mining sector in the areas of iron and steel, coal, tin, lead, uranium, and industrial minerals (barytes, granites, etc.). Libya*, another country that depends heavily on oil exports for its revenues, plans to increase its industrial base. However, delays in materializing such plans are anticipated given today's downward pressure on the price of oil.

Plans for diversification may not be possible if the main resource/commodity of the country fails to generate needed revenue. For example, uranium is the mainstay of Niger but the downturn in the world uranium market has caused slackening in further exploration, in developing new mines and in expanding existing ones. Yet, Niger is one of the world's most significant producers of uranium. The development of the uranium mining industry has called for heavy investment in new infrastructure, particularly for transport and power generation facilities. However, depressed uranium market conditions and lack of already developed diversified activity contribute to the stagnation of this country. Mauritania* depends heavily on iron ore exports for revenues and the economy has suffered in recent years from the weakness of the iron ore market.[1/] Morocco* depends largely on phosphate exports for revenues needed to import oil. Although sales revenues from phosphates improved somewhat in 1981, exports declined in terms of tonnage. The net result in 1981 was that phosphate export earnings covered only about 87 per cent of the cost of oil imports versus 96 per cent in 1980. Zambia is another example of an economy depending on the export of one mineral, namely copper.

Often non-diversified production problems are compounded when developing countries are facing monopsony or quasi-monopsony markets. Togo* is encountering both problems. Its only exploited mineral resource of any significance is high grade phosphate rock. In 1981, despite the increase in beneficiation capacity, output was reduced because of declining sales. As the 1981 recession hit the European fertilizer industry which is the

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1/ Principal markets for iron ore are France, Italy, Belgium, Japan, United Kingdom, Fed. Rep. of Germany and Spain.

* See Table 2, op.cit.

main buyer of Togolese rock - one of the rock washing units was closed. Of the African countries only Nigeria imports a relatively minor quantity of rock.

Fending-off rising energy costs

Energy availability and productivity are closely related. Industrial processing of minerals and of raw materials in general require the availability of reliable sources of energy at reasonable prices that will not undermine the market competitiveness of producer countries (which probably is based on low prices labour). The developing countries' accelerated socio-economic progress will continue to depend, on greater access to conventional energy sources, although a significant contribution may be expected from the new and renewable sources. Rising oil costs and their repercussions on exports' competitive advantage and current accounts deficits, have prompted research and development in conventional and non-conventional sources of energy not only in developed countries but also in developing ones. For the countries that can generate the necessary capital such as Morocco, substantial investment has been directed in developing one or more sources of energy such as hydro-electric power, oil, gas and shale oil.

African countries that produce and export oil and/or natural gas and that have reinvested their export revenues in diversifying their industrial base, they did not get affected hard by the world economic depression. Cameroon*, led by its growing oil industry, was able to perform well in 1981, along with other energy exporting African countries, such as Algeria*, Tunisia* and Libya.

Improving infrastructure

Although developing countries and especially least developed countries would benefit from increasing minerals exploitation and the degree of local processing they are unable to pursue meaningfully this course of action if they possess a very low level of basic infrastructure. Basic infrastructure

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* See Table 2, op.cit.

provides the basis for developing manufacturing industry based on local resource endowments.

Foreign investment in mining has played often a key role in developing basic infrastructure that facilitates the exploration, exploitation and production of mineral resources. However, several foreign-controlled mining ventures have tended to create enclaves in the national economy concentrating on these enclaves capital equipment and infrastructure. These enclaves fail often to be integrated with the national economy and they seem to integrate better into international markets. Although the mining industry in developing countries typically has few domestic linkages (especially backward linkages, i.e. mining equipment) some scope may exist for promoting certain forward linkages, for instance through final demand. This will in turn depend on the distribution of income. Since, however, the mining industry requires highly skilled workers and technicians, an elite of workers with higher than average incomes may be created. This, however, does not imply higher demand. Unless an economy has the economic structure that provides for a relative optimal distribution of income, the mining sector will not be able to provide a major basis for further linkages.

Several of the problems faced by the developing countries of Africa in developing their mineral resources are linked with inadequate infrastructure and lack of backward and forward linkages associated with the mining sector. For a country like Chad* - the world's largest landlocked country - the lack of transportation infrastructure is almost total. Chad is without a railroad and the interior of the country remains virtually inaccessible. Any minerals or petroleum projects would require substantial investments in infrastructure. In Ghana the non-availability of rolling stock from Ghana Railways continued to be the main limitation of production of bauxite and manganese. Similar problems are faced by Upper Volta*. Besides transportation, lack of water and power supplies are great hindrances to minerals development. Although Mali* has a considerable mineral potential, only a small gold mine, a modest production of phosphates and salt and a

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* See Table 2, op.cit.

quarry of construction materials are active. Mali, a landlocked country, suffers from lack of water and power as well as from poor external transportation. Inadequate infrastructure in Africa has been a great obstacle to minerals development mainly because of the large amounts of funds required and the shortage of investment.

Efforts to increase processing of minerals locally

At the present time, as Table 1 shows, there is a relatively minor processing activity in Africa mainly because of the constraints of inadequate infrastructure, lack of local and/or regional markets, trade barriers, lack of needed investment, difficulties in raising capital funds for processing activities and the risk of a downturn of prices of the products on world markets which could cause a cost-price squeeze.

Zambia and Zimbabwe process the bulk of copper produced while Zaire processes only about 26 per cent of its total production. Although Guinea* produced 13.29 per cent of world's bauxite, there is no indication of local processing. Some of the African countries process aluminium scrap such as Ghana, Egypt* and Cameroon. Secondary zinc is processed also in Zambia and Algeria.

In spite of above mentioned constraints, the establishment of processing capacities of minerals in situ appears to be pursued by many African governments in collaboration with international companies and consortia. Several factors may encourage these possibilities such as:

- o changes in technology which allow the economic production of some semi-processed minerals in smaller quantities at or near to their source (for example the rapid growth of iron ore pelletization plants and the development of direct reduction processes to produce an economic scrap substitute).
- o Inadequacies and inflexibilities of management and labour force in the traditional metal making centres result to relatively low productivities and high production costs (for example these are problems faced in steel-making in several Western European countries).

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* See Table 2, op.cit.

Increasing regional co-operation and trade

Africa has close economic ties with the industrialized markets both because of marketing ties and Africa's colonial past.[1/]

Developing countries, especially those with smaller domestic markets, complementary and/or similar resources increasingly recognize the benefits to be accrued from promoting joint efforts in the areas of marketing and processing, creation of financial support arrangements and development of their scientific and technical capabilities. However, in the area of mineral production and trade, the scope for regional and sub-regional co-operation seems to be severely constrained in Africa. Thus, in terms of consumption of minerals (especially refined) African countries could be classified as marginal consumers as Table 1 shows.

Of particular importance in the area of minerals processing is the role that more advanced developing countries play as producers of minerals, metal machinery and equipment and as consumers of metal and non-metal mineral products. They also play an important role in transferring technological know-how. Co-operation in terms of investments between these more advanced developing countries and African developing countries is increasing. Moreover, co-operation between African non-oil producing countries and producing oil countries (African and Mid-Eastern) has been increasing. Iraq, Libya and Algeria are co-operating with the Mauritanian Government (37 per cent share) in exploiting a sulphide ore mine.

1/ "If one thinks in terms of 'influence-spheres', Africa has always been within the European 'part of the globe'. European countries are relatively big net-importers of minerals because their resource base is worse than North America's or Soviet deposits though better than Japan's". (Raffer, op.cit., p. 4).

* See Table 2, op.cit.

Table 1

Africa's Share in Mineral Production and Consumption in 1980
Selected Minerals, in per cent of World Totals

	Africa	S.A.*	Africa-S.A.**	Major African Producers / Consumers
Copper:				
Mine production	17.45	2.73	14.72	Zaire 5.84, Zambia 7.75, Namibia 0.49, Zimbabwe 0.35
Production (refined)	10.07	1.69	8.38	Zambia 6.54, Zaire 1.5, Zimbabwe 0.29, Egypt 0.02
Consumption (refined)	1.17	0.93	0.25	Egypt 0.08, Zimbabwe 0.06, Algeria 0.04, Zambia 0.02
Alumina:				
Bauxite prod.	14.30	--	14.30	Guinea 13.29, Sierra Leone 0.74, Ghana 0.27
Primary al. production	2.62	0.54	2.08	Ghana 1.19, Egypt 0.56, Cameroon 0.32
Primary al. consumption	1.09	0.48	0.61	Ghana 0.04, Egypt 0.22, Cameroon 0.16
Lead:				
Mine production	7.53	2.49	5.04	Morocco 3.28, Namibia 1.0, Zambia 0.29, Tunisia
Consumption	1.89	1.09	0.80	Egypt 0.30, Tunisia 0.09, Algeria 0.10, Morocco 0.09
Zinc:				
Mine production	3.35	0.99	2.37	Zaire 1.16, Namibia 0.44, Zambia 0.40, Morocco 0.18
Slab zinc prod. (refined)	2.95	1.32	1.63	Zaire 0.70, Zambia 0.54, Algeria 0.39
Slab zinc consump. (refined)	1.78	1.07	0.71	Egypt 0.20, Nigeria 0.11, Algeria 0.10, Zambia 0.06
Tin:				
Production	6.18	1.42	4.76	Zaire 1.60, Nigeria 1.25, Rwanda 0.80, Namibia 0.50, Zimbabwe 0.45
Consumption	2.04	1.12	0.92	Egypt 0.22, Morocco 0.13, Zaire 0.07, Nigeria 0.45
Gold:				
Production	58.26	55.79	2.47	Ghana 1.26, Zimbabwe 0.94, Zaire 0.18, Zambia 0.03
Silver:				
Production	4.43	1.59	2.84	Zaire 1.16, Morocco 0.67, Namibia 0.43, Zimbabwe 2.75, Zambia 0.22
ANTIMONY:				
Production 1/	20.22	16.36	3.86	Morocco 3.29, Zimbabwe 0.47, Algeria 0.09
Cadmium:				
Production refined	2.49	--	2.49	Zaire 1.29, Algeria 0.80, Namibia 0.40
Nickel:				
Production 1/	8.89	3.60	5.28	Botswana 3.51, Zimbabwe 1.76, Morocco 0.02
Iron Ore:				
Production 2/	7.56	3.56	4.00	Liberia 2.22, Mauritania 1.01, Algeria 0.45
Chromite:				
Production 1/	>39.21	32.99	>6.22	Zimbabwe 6.22
Phosphates:				
Production 2/	>25.77	2.51	>23.26	Morocco 15.74, Tunisia 3.15, Senegal 1.29, Togo 2.23, Algeria 0.85
Natural Diamonds 2/	72.1	17.9	54.2	Zaire 32.31, Botswana 9.17, Namibia 3.44, Ghana 3.13, Sierra Leone 1.77 Angola 1.75, Liberia 1.04, Tanzania 0.71

Source: Cited in K. Raffer, "Raw Material Supply of Western and Eastern Countries: The Case of African Minerals", submitted to the World Trade and Commodity Policies Conference, (E.A.D.I.), 11-14 November 1981, Budapest; Non-ferrous Metal Data 1980, American Bureau of Metal Statistics Inc., New York, 1981.

1/ World Metal Statistics, December 1979, Vol. 32 (for Antimony, Nickel data for 1978)

2/ Mining Annual Review 1980 (data for 1979 provisional for Diamonds and Iron).

* South Africa

** Developing Africa excluding South Africa

CONCLUSIONS

Several of the developing countries in Africa appear to have relatively larger shares of one or more of the world mineral resources. However, their share in the supply of processed semi-finished and finished mineral products is, on the average, relatively low, with the exception of Zaire (copper, cobalt), Zambia (copper), North Africa (petroleum). The fact that most of developing Africa's mineral producing countries export the bulk of their mineral resources in unprocessed or semi-processed form, signifies that African developing countries do not obtain the additional economic benefits that subsequent stages of processing may generate.

While minerals extraction undeniably contributes to the general economic welfare of the mineral producing countries, further processing could create stronger forward (through sales to other sectors of intermediate inputs) and backward (through the purchases of intermediate goods and services) linkages and higher contribution to value added. Mining impacts in terms of both income and employment could become a substantial stimulus to development if incorporated with the economic activity in other sectors -- a possibility that increases with the level of existing economic diversification. However, so far developing Africa's mineral producing countries have by and large non-diversified economies and consequently they fail to fully benefit from the mineral production activities that take place resulting to foregone government revenues and lower domestic factor incomes.

The world economic recession of the mid-seventies to early eighties and the depressed markets for minerals hit particularly hard the African countries. The situation has been worsened with political unrest in several African countries. Poor demand resulting from the recession placed severe pressure on prices. In many cases, prices fell well below marginal cost of production for some mines and many companies have been forced to close down capacity.

Policies and strategies have been conceived and promoted, intending to mend the situation in the various African countries. These policies aim at achieving a broader spectrum of mining activity which could increase self-reliance and pave the road to a more sustained and diversified economic development. Among these policies we singled out the following:

- Co-ordination of planning activities and management as concern extraction, production and capital expenditure through mergers and development of necessary institutional framework;
- Creation of a stronger fund raising capability in the international money markets;
- More efficient utilization of technical skills and re-training of personnel;
- Strengthening the ability to develop research and development, prospecting, exploration and exploitation;
- Develop infrastructure, marketing and related services. Compete successfully in international markets by lowering production costs;
- Achieve greater economies of scale through mergers and technological change;
- Develop industrial and construction minerals with internal capital and borrowing in view of the fact that these minerals are important to national development but of little interest to outside mining houses;
- Attract new investments by enacting mining legislation that endeavours to both clarify and simplify contractual arrangemnets, by liberalizing the economy and by streamlining internal monetary policies;
- Reduce mono-product and monopsony dependency by diversifying production, by enlarging the industrial base, and by seeking actively trading alternatives; reduce political dependencies through regional associations and international contacts;
- Develop indigenous sources of energy;
- Promote regional co-operation especially between oil and non-oil producing African countries.

The above policies and strategies in conjunction with the renewed interest of several traditional and/or new types of mining investors and the emergence of new technologies for smaller-size production have been initiating new prospects and expectations for Africa's mineral

wealth and its optimal utilization.

Besides national policies and strategies international and regional schemes provide assistance to Africa's resources development. For example, during the second Lomé Congress a new system to save-guard export of minerals of African countries (Sysmin) was instituted. Under the new "Sysmin" system Zaire and Zambia received "ECU 40,000,000" and "ECU 55,000,000" respectively. This assistance was extended to support their cobalt/copper mineral sector.[1/]

1/ The Courier, May-June, 1983, p.8

ANNEX

Table 2 Mineral Resources of Africa/Production, 1980

	Algeria	Angola	Botswana	Burundi	Central African Rep.	Cameroon	Congo	Cape Verde Isl.	Egypt	Ethiopia	Gabon	Ghana	Guinea	Kenya	Ivory Coast	Lesotho	Liberia	Libya	Madagascar	Mali	Mauritania	Mauritius	Morocco	Mozambique	Namibia
Alumina													708,000												
Aluminium (thousand tons)						43			120			188													
Antimony (tons)	-																						549		2,000
Arsenic (White)																									
Asbestos									230															800	
Barium (tons)	91,000								3,000					6,647									318,000		
Bauxite												225	11,759											...	
Bentonite and Fuller's Earth (tons)	41,000								5,200														18,100	1,500	
Cadmium	130																								70
Cadmium Ores and Concentrates (tons)																			146,529						
Coal (tons)			371,393																				680,000	408,000	
Cobalt (metal content - tons)			226																				1,000		
Copper (Mine Prod.)	200		15,354			-															-		8,400	-	39,200
Copper (Smelter Prod.)																									40,000
Diamonds		1,500,000	5,146,000		279,000							1,200,000	84,000		40,000	33,714	300,000								1,560,000
Diatomite	3,600								100					1,677											
Feldspar									3,600					367										-	
Fluorspar									680	280	28			93,378									64,400		
Gold (Kilogram)		...		4		5	220					10,937		4			140		4	45	-				
Graphite	200,000	25,000							690,368										9,906						
Gypsum														-				...			14,000				
Iron Ore	3,500	...							1,870								17,481				8,900		78		
Pig-Iron	580																								
Steel Ingots and Castings	500								760																
Ferro Alloys									...																
Kaolin	18,100			2,750					49,000	30,000				1,487					2,720				115,500		
Lead	2,400						7,000																40,300		47,700
Refind Lead																									42,700
Lithium																								-	3,000
Magnesite																									
Manganese Ore									-		2,147,000	252,450											132,200		
Mercury	1,035,000																								
Mica																			1,642					200	
Nickel			15,442																				500		
Petroleum	51,560	7,610				2,790	3.130		31,200		8,880						86,020						14		
Natural Gas	14,600	...									...						...						80		
Phosphate Rock	1,023,400								638,000				-										18,824,200		
Platinum (Group Metals, Kilograms)										4															
Potash							-																		
Rare Earths				...																					
Salt	172,000	50,000						...	699,000	106,000		50,000	47,016				10,000	30,000	5,000		6,000		104,000	28,000	
Sillimanite																									
Silver	2,500																						10,000		
Sulphur Pyrites									3														60		
Talc									4,400																
Tantalum (Columbium)																									
Tin (Mine Prod.)						24																		-	1,000
Tin (Smelter Prod.)																									

Source: World Mineral Statistics, 1976-1980, Production/Exports/Imports (Institute of Geological Sciences, Natural Environment Research Council, London, Her Majesty's Stationary Office, 1982).

ANNEX

Table 2 Mineral Resources of Africa/Production, 1980

Ghana	Guinea	Kenya	Ivory Coast	Lesotho	Liberia	Libya	Madagascar	Mali	Mauritania	Mauritius	Morocco	Mozambique	Namibia	Niger	Nigeria	Rwanda	Senegal	Sierra Leone	South Africa	Sudan	Swaziland	Tanzania	Togo	Tunisia	Uganda	Zaire	Zambia	Zimbabwe
188	708,000																		87									
											549		2,000						13,013									130
												800							276,734		32,833							79
		6,647									318,000	...							2,635		-							230,949
225	11,739																	674						26,950				195
											18,100	1,500					3,978		52,335									
													70															
																			3,414,410	23,000						160	-	
								146,329																			-	352,475
											680,000	408,000			612,802				115,119,974		173,989	4,250				138,000	368,799	3,133,036
											1,000								200,683							14,700	3,310	
									-		8,400	-	39,200						185,800							- 439,700	609,935	24,901
1,200,000	84,000		40,000	33,714	300,000								40,000													- 423,700	601,348	26,700
		1,677											1,560,000					392,018	6,321,682			289,876				10,235,000		
		367																	584									
		93,378										-			5,000				52,247								475	1,283
											64,400								522,718					39,451				-
10,937		4			140		4	45	-							15			672,784							1,243	257	11,443
		-					9,906												-									7,385
						...			14,000					1,800					452,490	10,000		8,119		214,910			-	
					17,481				8,900		78								26,312		-			389				1,622
																			7,200					140				93
																			9,000					182				800
																			1,577,950									
																			137,854		-	7,434						221,910
	1,487						2,720				115,500		47,700		...				36,059					8,310			14,131	4,450
											40,300		42,700		100									19,195			10,047	
												-	3,000		...				39,975									21,030
252,450											132,200								5,693,426							16,586		78,217
							1,642					200							2,328	1,500	3							1,022
											500								25,700									15,075
						86,020					14				100,286									3,600		1,000		
						...					80				1,343									333				
	-										18,824,200						1,372,603		3,185,000		2,930,000			4,301,907	-			130,337
																			192,800									
															20													
50,000	47,014			10,000	30,000	5,000		6,000			104,000	28,000			227,000		140,000		367,000	82,000	36,734			436,514		51		
																			121,317									
															47,000				97,213					7,332		85,003	23,752	29,681
											10,000								302							30	101	29
											60								14,366									456
															350	60										40		41
												-	1,000	96	2,527	1,600			2,913							3,139		934
															2,684				1,100							300		918

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